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Sewage Poisoning in Cattle.

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(Presented to the Derbyshire V.A.)

Sewage poisoning, or sepsis intestinalis, has in cattle occupied the attention of the veterinary profession for several decades. No agreed decision, however, has been arrived at as to what type of sewage or what constituents in sewage bring about this condition.

Most practitioners have observed the baneful effects of dung passing a second time through the bowels of horses, cattle, and birds, and to an intensified degree during their early life. Nevertheless, very few veterinary surgeons can satisfy themselves that sewage is poisonous to cattle. Many say in their opinion it is not. One must respect the opinion of experience.

In venturing to bring my subject to the notice of the members of this Association I do so with an open mind. I want our Association to continue its progressive work. I expect members in debate to give information obtained under normal conditions on the farm of the effect on cattle compelled to drink sewage only: whether all sewage is alike injurious or not to farm live stock: if injurious, is there a degree in the potency of sewage, and, if so, what is the item or items in sewage which give rise to this degree of potency?

The word "sewage" is derived from the Anglo-Saxon "Scon"—to flow down—but what I desire to convey to this meeting as my acceptation of sewage, in so far as applies to its baneful action on cattle, is this:

Sewage is a material of diverse constituents. The virulence of its volume is decreased in proportion to the amount of water added before or after leaving the sewer, and by sewer I mean a channel which receives the drainage of two or more buildings occupied by different persons.

Sewage coming from inhabited houses is chiefly made up of the liquid and solid excretions of people, foul waters from kitchens containing decaying animal and vegetable matters; grease and other refuse; the suds from the washing of dirty linen, cooking utensils and the people themselves—holding in solution and suspension soap, fatty acids, alkaline powders used for washing, and the exudations from the human skin; dirty water from the washing of floors, swilling of yards, the solid and liquid excretions of animals, the drainage from stables and pig styes, the blood and other animal matter from slaughter houses, and the soakage from middens. Lastly, we find paper and chemical matter, the latter being regulated in quantity by whether there are any chemical works discharging their waste into the sewer.

The class of sewage I have elected to deal with is, what is termed by me, undiluted sewage. By that I mean sewage as we find it enter the main sewer before being diluted with water from some other source than that in which the water was originally contaminated, or by having a portion of its constituents removed. It is well I should point this out, otherwise, in the debate, side issues may arise not bearing on my subject.

Sewage as described above comes from large villages or small towns, and is usually discharged into a stream. It is to such sewage that the matter contained in this paper will directly and indirectly refer and with which it will deal. Cattle have been drinking water polluted by sewage for many decades, and it is only within the last forty years that a herd having no other source of drinking water than that in undiluted sewage have been observed to suffer therefrom. In my judgment the explanation of this is that prior to forty years ago the sewage did not contain the large amount of alkaline and other chemical matters it does to-day.

The normal secretion of the small intestine is alkaline in reaction—when a large quantity of liquid, strong in alkalies, enters the fourth stomach it is quickly passed on to the small intestine, and, therefore, the acid secretions of the stomach do not have time materially to reduce its alkalinity.

The primary effect of large quantities of liquids, strong in alkaline, flowing daily over the mucous membrane of the small intestines, is to give rise to slight irritation and congestion and to perverted function in this part of the alimentary canal. At this stage the large intestines are not involved.

The secondary effect would appear to start about the twenty-first day, and is of a slow chronic inflammatory type, associated with gradual thickening of the mucous membrane, and, by the third month, of the underlying tissues. The large intestine now becomes involved.

The clinical observations up to this juncture are:—animals under one year old are most susceptible, next in order are animals under two years old; after that I have been unable to discern

differences resulting from age. About the end of the second week, or the beginning of the third week, the subject is dull and listless, with a slightly staring coat, and in other respects is unthrifty to a degree.

While under the influence of sewage these symptoms, as time goes on, gradually become more apparent. About the fourth month the animal mopes about, back up, head down; pregnant animals may or may not abort, some purge, others are constipated.

At this period the resistance of the animal to the action of the toxine given off by the various bacteria in sewage would appear to get less and less, and, therefore, its influence on the body becomes increasingly apparent.

Sewage, or sewage effluents, contain one or more million organisms per c.c., with a minimum in winter and a maximum in summer.

One now inquires: what are these toxins? So far as my investigations go, of the bacterial contents of the class of sewage now under consideration, they are derived from certain bacteria which live on dead matter and are known as saprophytes, and from other which thrive only on living matter, and hence are termed parasites. By far the larger number belong to the class of the *bacillus coli communis*.

I suggest that the toxins from the saprophytic bacteria are not increased in the alimentary canal, but those from the parasitic bacteria are, and are probably of a more virulent character. Should the *bacillus coli communis* take on characters of the *bacillus typhosus* then, in my opinion, the subject will purge. If it does not, then the subject will be constipated. Some say the *bacillus typhosus* is simply a more virulent form of the *bacillus coli communis*.

The question as to the amount of toxins present is interesting. If one may judge from the cultures of these organisms they must be considerable.

I feel justified in saying, if that be so, there is no reason why as much or more should not be given off from the *bacillus coli communis* or other similar organisms in a bowel, in which the resistance to such is to all intents and purposes stopped.

What the toxins are chemically I am not in a position to say. The condition, I contend, resolves itself into one of auto-intoxication, and the clinical symptoms, I further contend, support that view.

The pathological state of the involved tissues of the bowel, so far as I can make out, go to show the mucous membrane to be much thickened, and thrown up into rugœ running irregularly across and along the length of the bowel. In places there seemed to be loss of the superficial layers of the mucous membrane.

Peyer's patches were not apparent. The microscopic examination of these preparations failed to show the presence of any acid-fast bacilli.

Cattle at times prefer sewage to clean water. I suggest this is due to the saline present, making the liquid portion more palatable.

The presence or absence of complications in cases of sewage poisoning, arising through other causes is, to me, beside the question. Their presence does not in any way reduce the baneful action of sewage on cattle, but would, on the contrary, in my opinion, intensify it.

When cattle suffering from sewage poisoning at the experimental centres under my observation were stopped drinking sewage they slowly but surely recovered. The yearlings were the slowest to make complete recovery—usually about twelve months—but all the animals put back on sewage the following summer went off as badly as ever.

I, therefore, contend that it is reasonable for me to suppose sewage to be the cause of the abnormal conditions I noted in these animals under observation.

Discussion.

Mr. De Ville thanked Mr. Levie for bringing forward a subject that was prominent in the minds of most of them at the meeting. Personally, he had a good deal to do with an important case that was tried in Derby a few months previously. He asked why Mr. Levie had left out all mention of horses from his paper? Were they not liable to sewage poisoning? They knew that in a state of nature cattle would drink what appeared to be unfit dirty water, but nature had a strong tendency to purify an impure water supply. Cattle also had a very strong resistance to septic poisoning. He would like to know to what Mr. Levie put down what he called the alkaline condition of the bowel. Was it due to chemicals in the water or to the toxins which he had spoken about? He took it to be due to the animal absorbing toxins into the system. When they saw plants growing in sewage and small animals swimming about in it, nature had so far purified the stream that it was fit for cattle to drink from. Mr. Levie talked about animals drinking concentrated sewage. That was not an ordinary case. Sewage was generally diluted in some form. He did not think animals would drink thick black undiluted sewage when they could get to water.

The President asked what Mr. Levie meant by concentrated sewage.

Mr. Levie replied that he meant sewage as it came from the main sewer. He spoke of undiluted sewage without the addition of water or the extraction of any of the constituents.

Mr. De Ville handed round a sample of water which, he said, cattle drank in preference to a clear stream 50 yards away, and a sample from another stream where the animals had no choice but drank with impunity. Though both samples appeared very dirty he had never heard that there was any harm to the milk. He was inclined to think that in speaking of alkalies in the small bowel, Mr. Levie

had got mixed up with Johne's disease. Sir John McFadyean said that there was no other disease in an animal where they got the characteristic folds of Johne's disease. Mr. Sheather and Professor Wooldridge said the same thing. Mr. Trigger and Mr. Dawes were of the same opinion. He would like to know, if sewage poisoning was so general why they did not get more deaths? Mr. Levie appeared to be the only authority on sewage poisoning and he was a recent convert. Not so long ago in a court of law he spoke quite the other way. Years ago he (Mr. De Ville) was inclined to put scouring down to the drinking of dirty water and sewage, but further experience had made him familiar with Johne's disease and contagious abortion—both due to germs. He could not understand Mr. Levie contending that in some cases there was constipation and others purging. How many members could positively prove such conditions to be due to sewage poisoning? Sir John said sewage was not poisonous, and they must accept that opinion when they, in practice, did not find Mr. Levie's theory carried out, but rather what he thought was due to sewage was due to some other cause. Horses were particular, but they would drink sewage contaminated water and even stir it up with their feet before doing so. If they got sewage from farm buildings they found it far more dangerous to cattle than sewage from a village, because that from farm buildings contained the germs of abortion disease, Johne's disease, anthrax, foot-and-mouth or any disease that was about. He would like to know what germs from the human source caused any disease in cattle beyond that of the thickening of the bowel. Mr. Levie did not give a specific germ that caused the disease, but contented himself by mentioning millions per c.c. Cattle did not take tuberculosis from the human race, and cattle must have a very strong natural resistance or the bovine race would have been wiped out long ago. He would like to hear the experience of every member present who had known of cattle drinking from streams that had been polluted with sewage, and of drinking sewage that had passed through a filter.

Mr. LEVIE interposed with the remark that if such experience were wanted some member should read a paper on the subject to open up the discussion. Those were matters quite outside the paper that afternoon. The subject was "Sewage poisoning in cattle."

Mr. DE VILLE said sewage poisoning could only be discussed along with any disease that might stimulate it. He had never seen a case of sewage poisoning and he doubted if any other member there had seen one either.

Mr. LEVIE replied that Johne's disease and abortion might be associated with sewage poisoning in cattle. He had heard with respect the opinions of Sir John but he still felt himself entitled to his own opinion.

Mr. DE VILLE: You have described to me a *post-mortem* concerning which I am in agreement with Sir John as being one of Johne's disease.

Mr. DUCKWORTH: This discussion has arisen out of a court action, and it is a matter of opinion between Sir John McFadyean and Mr. Levie. I do not think it has anything to do with the paper before us.

Major BAGSHAW confessed "gross ignorance" of sewage poisoning in cattle. Many of them had thought they had had cases and had modified their opinions. He did not quite understand Mr. Levie's reference to alkaline and fatty acids. He wished to know if they would not neutralise and form an innocuous compound. Or would they not have either a weak acid or a weak alkali according to which was the stronger originally?

Mr. KING thought they ought to appreciate the large amount of thought Mr. Levie had given to the writing of his paper. The subject was one they would have to look into very deeply. Mr. Levie appeared to have confused, in the wording of his paper, the absorption of toxins as being a cause apart from alkaline poisoning. He spoke of a large quantity of alkali being present and then went on to speak of poisoning by toxins. He made slight reference to *bacillus coli communis* and said some people seemed to mix it with *bacillus typhosus* knowing quite well it was impossible quite definitely to distinguish them. He made the definite statement that sewage poisoning resolved itself into auto-intoxication. Mr. Levie surely did not quite mean that. The point to him was whether sewage poisoning actually came from the results of proteid disintegration, or whether it arose from toxins produced by the organisms present in decaying matter. He could not think that the small amount of alkali present in sewage was likely to cause any great amount of trouble in the intestinal canal. In the case spoken of in the Assize Court the Judge said it was common sense that the drinking of sewage would be harmful to animals. They did know that there were certain substances known as ptomaines which produced toxic symptoms. But those symptoms were sudden and very rapid in their onset, and usually very rapidly fatal. They did not produce the chronic condition seen in the bowels of animals put down by some to Johne's disease. He asked what the normal condition was of the mucous membrane of the ileum in cattle? He opened the other day a cow which was suffering from tuberculosis. The ileum had a very pronounced cerebellar appearance and there were also very distinct lines running along the membrane of the ileum. He assumed the condition was due to the organism of tuberculosis, and there was a large amount of congestion present. That was not a factor of Johne's disease at all, but he did think on *post-mortem* examination it was often very difficult to determine certainly in a slight case to what the lesions on the ileum might point. His point

was whether ptomaine poisoning may be responsible for illness in cattle. He did not think there was sufficient evidence. Secondly, whether organisms present in sewage were themselves capable of producing a condition known as sewage poisoning. He did not think there was evidence in support of that case either.

Mr. BRIGGS said the natural action of some of the bacilli might cause diarrhœa, and the natural action of others might even cause constipation. From a bacteria point of view he asked if an acid medium were essential to the production of a toxin by the multiplication or evolution of bacteria or could they get the same poisoning signs in an alkali medium ?

Mr. HOWE thought Mr. Levie's paper provided food for discussion, but he had yet to learn from his own experience that sewage, speaking in a broad sense, was detrimental to the well-being of cattle. He could, perhaps, have understood some of Mr. Levie's remarks better if he had told them the result of analysis of sewage water. The long continuance of irritation caused by drink or food would cause a thickening of the small intestine. Another thing they had to bear in mind in a bovine animal was the formation of the stomach. It was pretty well protected against irritants. Experience had taught him that cattle in summer would get water from very low pools into which they had passed excreta, yet no ill consequences had followed. Had Mr. Levie given them an analysis of samples of material taken from the bowel of one of these animals which had died, and also a microscopical examination, they would have been helped considerably.

Mr. MARRISON, as Secretary, thanked Mr. Levie for his paper. It was a very difficult to get someone to come forward with a paper to make a meeting interesting. He would like to tell Mr. Levie of his own rather unique experience. In Bakewell thay had one of the most glorious sewage schemes of any town in England. They started in the centre of the town with a rubble drain opening into a wide ditch which flowed through the meadows into the river. All along they had cattle drinking sewage water because there was no other water for them. He had rented two of those fields for twelve or fifteen years, and had grazed cattle, horses and milk cows there. He had never seen the slightest injurious effect from the drinking of sewage. Some time ago he went to the trouble of making a dyke with a much cleaner water supply, and wired off the sewage. The cattle broke down the fences, however, and got to the sewage. Milk from the cows was used in the house without any deleterious effect. He failed to see what influence sewage could have on cattle unless the sewage carried the bacilli, say, of scarlet fever or typhoid. He wondered if cattle suffered from things which could be confounded with Johne's disease. One could only get at the differences in the diseases by means of the microscope. He asked if it were possible for cattle which drank sewage to convey by means of the milk scarlet fever or typhus to humans. He was not quite certain how the milk could be contaminated.

Mr. FURNISS pointed out that Mr. Levie spoke of some experiments he had conducted, and asked if cattle drinking sewage water would lose condition. Mr. Levie had put cattle on clean water after sewage and they had regained condition. Put back on sewage they lost condition. Those were conditions Mr. Levie could vouch for. That surely was irrefutable evidence that cattle were affected adversely by drinking sewage-contaminated water. That being the case he (Mr. Furniss) felt quite repaid by the loss of half a day at Derby.

The PRESIDENT also thanked Mr. Levie, but said he was sorry that horses were not included in the scope of the paper. He once had cause to suspect sewage poisoning in cattle. Water was contaminated by sewage and then came through a colliery. The cattle were very badly affected. Some had diarrhœa and some constipation. There was staring of the coat, the muscles of the back went and the animals were unthrifty. They were taken from this land and put on other land, and within a couple of months began to grow. They were returned to the original land and went off condition again. An analysis showed the contamination to be due to stuff that came from the colliery with a strong acid reaction. A horse that was left on the place died. A *post-mortem* showed the mucous membrane of the stomach to be inflamed; erosions on the large and small intestine. " I do not think," said the President "the sewage had anything to do with the matter. In all the cases I had in which sewage was suspected I found some other cause." Whether cattle could grow on sewage water without ill after-effects he could not say.

Mr. DE VILLE : " Why do we not all get those cases of sewage poisoning in villages where the sewage goes on the land ?

Mr. LEVIE : You do, but you do not recognise it.

THE REPLY.

Mr. LEVIE went on to say that he often had clients coming to him to discuss the question of sewage poisoning, and in all cases, prior to the present investigation, he had found the affected cattle benefited when he removed the cause. In every instance he removed the cause by getting the owner of the stock, cattle in particular, to see that the stock had not an opportunity of drinking sewage. He was not speaking of sewage such as that of which Mr. De Ville had brought samples, but of sewage as it came from the sewer and had run into the course of a dried-up brook. It was from observations under such conditions that he had obtained the materials he had included in his paper. He was aware of the fact that sewage

that had passed over soil or pebbles lost some of its virulence. It was sewage under such conditions that the Secretary had dealt with at Bakewell. He had had no experience of such sewage doing any harm. Mr. De Ville had said: "Mr. Levie at one time said in a court of justice that such sewage was harmless to cattle. He is now a convert and says this." He (Mr. Levie) denied the charge. He was called by the Medical Officer of Health to investigate diluted sewage at Heanor, suspected of injury to cattle and the deaths of one or two more. The specimen shown to him he diagnosed as tuberculosis. He was asked to go out and examine the cattle on the farm and the sewage conditions. He did so, and saw a field flooded with diluted sewage. He concluded that the condition was not doing any direct harm, and he diagnosed the case of one cow to be tuberculosis. At the case in court he said, in his judgment, sewage had nothing to do with the condition of the animal in question which was suffering from bovine tuberculosis. The Urban District Council for whom he gave evidence won the case. How it was that the story had gone out that he said sewage did not do cattle any harm he could not say, but he wished emphatically to state that no such evidence was given by him. When the cow died the Medical Officer of Health certified the cause as pulmonary tuberculosis. Adverting to the case this spring, he was said to be a convert to sewage poisoning, and was saying diluted sewage was injurious to cattle, but did not say anything about horses. He had said no such thing. What he did say was that sewage, a discharge from a sewer, could not be beneficial to animals. Apart from being a professional man, it was unthinkable to him that it could be otherwise. He was delighted that so many members had taken part in the discussion on his paper. They all had to respect each others' experience, and not think that such knowledge was unworthy of note. He respected the views of every practitioner, before that of the so-called scientific man. Mr. De Ville said they could not have abortion from sewage unless the abortion bacillus was in that sewage.

Mr. De Ville: You cannot get contagious abortion without the bacillus.

Mr. Levie went on to point out that in his paper he said "cattle may abort." He maintained that they could get cattle aborting through drinking an excess of sewage, but it was not contagious abortion. As to the complaint that he had not included horses, he pointed out that the subject was "Sewage poisoning in cattle." He had no knowledge of sewage poisoning in horses. Members had used reasonable criticism in regard to alkalies and toxins. He did not say that alkalinity of the bowels caused this disease and toxin caused the other. What he did wish to convey was that if they had strong alkali or acid continually pouring over a mucous membrane, they would cause thickening as a result of the irritation set up. He had had that himself in the case of an acid. One member suggested that if the sewage contained a fatty acid and a strong alkali they would form a soap. He agreed, but the amount of alkali so far exceeded the acid that it was not all neutralised. By far the larger portion passed into the fourth stomach and was quickly passed on. From his observation he found that the spurious alkali set up an irritation which, being continued, showed a pathological condition which gave rise to the condition he had described in the mucous membrane, so that the normal function was retarded. Not till then did the toxin come into action. Mr. De Ville had said that small animals could float about in sewage in perfect health, but it was difficult to understand what small animals he meant.

Mr. De Ville: I mean tadpoles and such things. Showing that the water is fit to drink.

Mr. Levie said it was a well-known fact that diluted sewage would kill practically all the fish in a river. If it did not kill tadpoles he was surprised. It had been asked how it was that some animals had diarrhœa and others were constipated. So far as he had been able to make out an animal suffering from diarrhœa, under conditions such as he had described, started scouring early after being put on sewage. It was because alkalinity had not been present or the amount of toxin had been so great that toxæmia would occur and bring about that diarrhœa. Diarrhœa was a symptom, not a disease. They got diarrhœa in sewage poisoning because nature was endeavouring to eliminate that toxin through the bowels. "In the case of animals constipated I say the amount of toxin has not been sufficient to overcome the natural resistance of the animal at the time, because, if you note, the animal that scours is generally either a weakling or getting towards that category. If time is allowed, the resistance of the bowel is reduced by the pathological changes which have taken place within its membrane, both mucous, sub-mucous and deeper layers. Not till then do we get the scouring. That is my opinion. It is up to some one to do the pioneer work, for I have been unable to find any literature to help in any way." It had been said that sewage from farm live stock was far worse than from human beings so far as cattle were concerned. He did not deny it. He admitted the *bacillus coli communis* gave off gas bubbles and produced an acid condition. He was not dealing with that part of the bacteriology. What he was dealing with was their toxins which, he contended, were of a poisonous character, and he was supported by eminent bacteriologists such as Richardson, of Montreal. Mr. King thought he had got a little mixed up with auto-intoxication and toxins. Surely all that auto-intoxication meant was self-intoxication. If he were not eliminating bile from his liver and suffered from jaundice, that was auto-intoxication. In bacteriological language

they usually applied it to some material given off by the micro-organisms that, not being discharged were re-absorbed into the system, produced a certain condition. Where they had the bowels of animals so altered that their resistance was reduced to a minimum they had not only toxamia from organisms that entered with the sewage, but they had also the toxins eliminated by the organisms in their own body. So they had auto-intoxication associated with toxæmia. Mr. Howe raised the point that he had not given the bacterial count of sewage. He wanted to keep outside the case that had been since brought into the discussion, but he would now say that the bacterial count varied according to the temperature. In sewage that had come into a brook the bacterial count went up to many millions in one c.c. in summer, but as it came from the sewer it was as low as one or two millions. Chemical analysis was outside his jurisdiction as he was not an analytical chemist. He had figures, but as the analysis had been done by someone else he would not deal with it. With the statement that cattle could drink diluted sewage and appear none the worse he was in agreement, except that he had seen cattle that drunk such sewage aborting, yet when they were removed from sewage they got all right. With regard to milk, however, he had proved that the milk from cattle grazing on sewage farms would not make good cheese. Such cheeses went rotten far more quickly than the ordinary. It was not that the bacteria passed from the system into the milk apparently, but that some material of a destructive character was eliminated along with the milk, and must produce a bad effect on the milk for keeping purposes. In conclusion, Mr. Levie said he had appreciated the criticism, and the fact that his paper had created so much interest in debate. He hoped that other contentious papers would be brought forward, and that the progress of the Society would be aided thereby.

Lord Lascelles and Veterinary Science.

Comments from many Sources.

As was to be expected, the vigorous criticism of veterinary methods and education made by Viscount Lascelles at Northallerton, which was dealt with in our editorial columns last week, called forth a considerable amount of comment.

The representative selections given below reflect the fact that in the tone of the Press protest far outweighed approval.

Professor Wooldridge and "The Mail."

"Viscount Lascelles has been entirely misinformed," said Professor G. H. Wooldridge, of the Royal Veterinary College, Camden Town, N.W., to a *Daily Mail* reporter, regarding Lord Lascelles' statement at Northallerton, Yorkshire on Thursday, that the Royal College of Veterinary Surgeons seemed to take 'a mediæval view' of the treatment of disease in cattle.

"Slaughter," continued Professor Wooldridge, "is never recommended in cases of contagious abortion, and it is absolutely incorrect to say that it is recommended by the College. In many cases of tuberculosis in animals, treatment has been and still is resorted to with great success; and where a tubercular cow is slaughtered it is always done in the best interests of the public, to prevent infection through milk.

"The fact that the Royal College of Veterinary Surgeons is the only portal to the profession safeguards the public from anyone who might foist himself on to them as a qualified veterinary surgeon. This profession is not like the medical profession, to which there are several entrances—not to say back-doors. The College is very jealous of its position in this respect and is determined to maintain it."

Mr. Henry Gray's Reply.

Mr. Henry Gray, in an article on the subject in the *Yorkshire Post*, says:—

Lord Lascelles's speech to the Northallerton Agricultural Society will be read with uncommon interest by veterinary surgeons, though there will be some difference of opinion on his criticisms of the methods of veterinary practice and the scope of veterinary education.

I should like to say something first on Lord Lascelles's statement that "the Royal College of Veterinary Surgeons was very apt to take what he ventured to call the mediæval view of curing disease." Now I have no hesitation in saying, after forty years of veterinary practice in town and country, that there is no method of preventing the spread of animal disease which would yield anything like the same economic results as the method of stamping out by slaughter. The method was first suggested in Italy in the time of Queen Anne by Lancisi, the physician to the Pope of that day. Shortly afterwards Thomas Bates, surgeon to George I, put the system into practice in England and very quickly stamped out an outbreak of cattle plague. But the lesson seems to have been lost, for when in 1865 John Gamgee, on outbreaks of cattle plague which had come as he had foreseen from Russia, urged the immediate slaughter of all animals infected or in contact, his advice was not listened to. The public was crying out for "cures." But the plague went on in spite of a Commission of doctors and other experts. Then, when our herds had all but disappeared, the country was driven to adopt Gamgee's policy of the poleaxe, and the ravages of the plague were stayed.

The question must be viewed entirely from an economic standpoint. It is cheaper in the case of animals to prevent disease than to cure it. A "cured" animal is a constant source of danger. Veterinary surgeons have no self interest in supporting the drastic method. It would obviously be more to their personal financial advantage to cure disease than to prevent it. Under the drastic method, after all is said and done, we only kill about one in eight hundred of our cattle. If we allowed disease to extend all over the kingdom by departing from the stamping out method, we should, it is estimated, lose about 1½ per cent. of our cattle, or twelve in eight hundred. Foot-and-mouth disease is not necessarily a fatal disease. If nothing were done to the infected cattle beyond suitable feeding 90 per cent. of them might recover. But, on the other hand, we should lose, three months' feeding of fat cattle, there would be the loss temporary or permanent, of milk, and the loss of calves by

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BOTULISM.

According to unofficial opinion the recent occurrence of food poisoning in Scotland is due to botulism. If this should prove to be the case it is yet one more link in the chain of evidence which goes to prove the absolute necessity—in the public interest—of establishing a closer intimacy between the several branches of medical and veterinary science. At first sight it appears to be a case of historical repetition. A few years ago forage poisoning of horses and cattle in the United States of America was recognised as being caused by B. botulinus, and almost on the heels of this discovery numerous cases of fatal botulism occurred in man. Prior to this a disease of horses in Scotland, which received the popular name of "Grass Sickness" (owing to the fact that it developed in animals during the period when most of them were turned out), was under investigation. Latterly there has been reasonable ground for supposing that B. botulinus played an important rôle in the production of the symptoms which characterised this disease. Indeed, experiments carried out on an extensive scale during the past few months with a view to elaborating preventive measures on entirely new lines have gone far to justify this belief Veterinary research workers have proceeded a considerable length in the investigations of the etiology of botulism, and as a result of their investigations have evolved a new method of producing an active immunity against bacterial intoxications, the limitations of which are as yet unknown. Moreover, as a result of the investigations of "Grass Sickness," material for the treatment of botulism in man is available. It is to be hoped that a more close co-ordination between the research workers in the field of comparative pathology (as it is called) may result *inter alia* in the more rapid application of remedied methods which are of value in the saving of human life and the maintenance of the public health.

Lord Lascelles and Veterinary Science.—*contd.*

abortion or early death. We should also be prevented from exporting. It is a reasonable estimate that, by the drastic method of killing the infected cattle, the country has been saved at least £10,000 during the period of the recent outbreak alone. Our system may be "mediæval," as Lord Lascelles suggests, but the proof of the pudding is in the eating. The fact is that Great Britain is now freer from preventable animal disease than any country in the world.

With regard to Lord Lascelles's criticism of veterinary education in this country, my own view is that it compares favourably with that of any other country, in spite of the fact that it is supported almost entirely by means of the fees of students. The Advisory Committee reported last year to the Development Commission on Research into Diseases of Animals that Dr. William Bulloch, Professor of Bacteriology in the University of London, who had acted as examiner in pathology to the Royal College of Veterinary Surgeons, had stated it as his considered opinion that veterinary students were better grounded in pathology than medical students. The Committee's report went on to state that the present subsidy to the Royal Veterinary College, London, is £3,300 per annum, whereas the Berlin Veterinary College received in 1913 a subsidy of over £28,000, the Brussels College an annual subsidy of over £7,000, and the veterinary faculties at Melbourne and Sydney annual subsidies of £4,000. The total income of the Glasgow Veterinary College in 1919-20 was £2,000, and of this sum £996 had to suffice for the salaries of ten professors. The Edinburgh College during the year ending the 15th May, 1920, received a Government grant of £400.

Lord Lascelles said that the Royal College of Veterinary Surgeons "had a syllabus which included no other form of learning besides veterinary science." Why should it be otherwise? The first object of the College is to turn out practical and capable veterinary surgeons. But there is nothing to prevent a student taking, in addition, degrees at Liverpool and other universities, as students have done in a number of cases. In my opinion, the professional education given by the veterinary colleges is sufficient for the ordinary practical requirements of the State. Veterinary students are as a rule poor men, and their opportunities of gaining a good income from the practice of their profession have been circumscribed by the rise of the mechanically propelled vehicle. As it is, they have to go through a severe course of instruction lasting for four years, in all the branches of science which have a bearing upon the practical application of their profession. As to general education, the entrance examination for the veterinary schools will be from May next of the London University Matriculation standard.

With Lord Lascelles's remarks on the Canadian cattle embargo I find myself in general agreement. It is even more a military than a veterinary question. If Canadian live cattle are imported in great numbers into England our farmers will stop breeding. That being so, if we should find ourselves involved in a great war once again, with our overseas supplies cut off, where could we turn for the cattle to supply our immediate needs? One cannot improvise breeding stock. It would take several years to get breeding going again. From the point of view of national safety the House of Commons should have paid more attention to the farmers than to the butchers.

PALL MALL AND GLOBE "SPECIAL."

The "Special Representative" of the *Pall Mall and Globe* writes:—

"Viscount Lascelles's criticism of the method of the Royal College of Veterinary Surgeons in granting their degree, made at the Jubilee Show at Northallerton, is not taken too kindly in veterinary circles.

"It is averred that he is simply giving voice to the movement now on foot to allow various Universities the power of granting a licence to practise veterinary medicine and surgery.

"The Royal College comes under the ægis of the Board of Agriculture, and not under the Board of Education, as do the Universities.

"Moreover, the former Board is in a position to make extensive grants for the purposes of agricultural research, and it is stated that it is these grants the Universities are after.

"So powerful is this movement, headed by Cambridge, Liverpool, and other 'Varsities, that it is not possible that in time the Research Department of the Veterinary College will be starved out of existence, while a monopoly of the branch will be given the University.

"With regard to Viscount Lascelles's statement that the Veterinary syllabus does not contain any form of learning other than veterinary science, Professor G. H. Wooldridge, of the Royal College, told me to-day, that the syllabus comprises chemistry, physics, botany, and zoology.

"Moreover, before one can enter on a veterinary course, it is essential that matriculation will have been previously passed by the entrant.

"The veterinary profession," he continued, "has always been the envy of the medical and other professions, because there is no back-door entrance to it.

"The only portal is through the Royal College of Veterinary Surgeons, which conducts examinations for all students trained at recognised colleges.

"The Royal College is the only examining and diploma-granting body; and this is a splendid thing, because a high standard is thus perpetually maintained.

"Viscount Lascelles must also have been misinformed when he affirmed that cases of foot-and-mouth disease, contagious abortion, and tuberculosis could only be slaughtered.

"Cases of contagious abortion are not slaughtered, for there is a simple treatment that generally leads to recovery.

"Cases of foot-and-mouth disease, again, are slaughtered by order of the Ministry of Agriculture for fear the disease might become indigenous to this country. The slaughtering has nothing to do with the resources of the Veterinary College."

Dr. Adami Agrees.

The *Liverpool Daily Post and Mercury*, of 12th August, contained the following:—

"Viscount Lascelles's criticism of the Royal College of Veterinary Surgeons, reported in Friday's issue, was read with interest in Liverpool University circles. In discussing the subject with a *Daily Post* representative, Dr. Adami pointed out that Liverpool University leads all other universities in the United Kingdom in the completeness of its course in veterinary medical science.

"Is Lord Lascelles right in stating that the Royal College of Veterinary Surgeons is mediæval in its views?

"I am rather inclined to agree with the Viscount," said the Vice-Chancellor. "He has been in Canada a good deal, as aide-de-camp to one of the Governors-General, and he has no doubt found that a better class of men take up veterinary science there than here as a general rule, excepting, of course, the students who take this course at Brownlow-hill. For I can assure you we have some very able men among our veterinary graduates and undergraduates. Last year, a veterinary student, Thomas Hare, who was president of our Guild of Undergraduates, has proved himself one of the best men at Liverpool University. So that Lord Lascelles's argument certainly does not apply to such men as Mr. Hare, when he complains that this country wants 'a method by which the greatest brains in the country could be included' in the cause of veterinary science.

"For ten years we have been granting these B.V.Sc. degrees, and last year we had some fifty students in this department. These men are quite up to the standard suggested by Lord Lascelles. For the most part they have come from good country stock and are keen, healthy, and intelligent chaps—a distinctly useful group in our university life.

"Wherein does the course at Liverpool University differ from, say, the course at the Royal College of Veterinary Surgeons, the Royal Veterinary College, and such universities as London and Edinburgh?

"I am very pleased indeed that Lord Lascelles has brought this matter up, as it affords me the opportunity to put this thing right, so the public may understand just where Liverpool University comes in. In the first place, the Royal College of Veterinary Surgeons grants diplomas, but gives no teaching. A man who gets a degree from such an institution may miss one of the finest features of mental training, that is the 'atmosphere' of university life. On the other hand, the Royal Veterinary College at Camden Town does give the teaching as well as the diplomas. London University provided a veterinary science course before we did, and at Edinburgh they have taught along similar lines, that is to say, both London and Edinburgh have provided only partial courses.

"Does Liverpool University stand alone in this forward development of veterinary science?

"Yes, if you like to put it that way. We were the first in Great Britain to establish a full course in veterinary medical science and surgery, and in this respect we undoubtedly lead. The result has been that we have overcome long ago the difficulty spoken of by Lord Lascelles with regard to the quality of our veterinary students. Some of them are among the brightest men we have.

"Do your Bachelors of Veterinary Science find ready employment in England?

"Many of them do. But Liverpool has a way of its own in pathfinding and pioneering. Our B.V.Sc. men are now to be found in India, East Africa, South Africa, and in many other parts of the world; and I know, from what I have learned from time to time, that they are making good in those countries. The profession is a most useful one, and, as Lord Lascelles has pointed out, gives scope for brains as well as the other professions, and good men are needed to take it up.

"From your remarks and those of the Viscount, it might be gathered that England is not quite abreast of the times in veterinary education?

"England as a whole is behind Canada and Australia and the United States in not affiliating its veterinary schools with the universities. That is one of the weak points of our present system. To show how complete our course in Liverpool is, I may point out that five years' study is required to entitle a man to our B.V.Sc. degree, and the first two years of that course is precisely the same as is our medical course. In speaking up now, Viscount Lascelles is doing a good work. His whole argument is one that we have long recognised at Liverpool University."

A Newcastle Opinion.

A *Newcastle Daily Journal* representative has ascertained the opinions of local veterinary surgeons upon the points raised by Lord Lascelles, and one prominent surgeon discussed the speech at some length.

"I am inclined to think," he said, "that the noble lord has been reported incorrectly when it is stated that he said 'the Royal College of Veterinary Surgeons is apt to take the mediæval view of curing disease.' Was he referring particularly to foot-and-mouth disease or the many diseases that the domesticated animals are heir to? Because such a point is important in discussing his accusation.

"Veterinary schools are to be found at London, Edinburgh, Liverpool, Glasgow and Dublin. Some are under the direct control of universities, and in several cases share with the medical students the lectures delivered by the same professor, viz., botany, zoology, chemistry, physics, physiology, histology materia medica, comparative pathology and bacteriology, sanitary science and meat and food inspection. The examiners for the veterinary students are chosen by the Royal College of Veterinary Surgeons, and the diploma is also issued by this body.

"Post graduate degrees, D.P.H., D.V.S.M., D.V.H., etc., may be obtained by any qualified veterinary surgeon at any recognised school or university who grant such degrees. if he has the time, money, or inclination to study to obtain them.

"With regard to the present-day standard of veterinary science, it will stand the closest scrutiny. The Great War was the veterinary profession's 'acid test,' and we came through our ordeal successfully—can I say triumphantly? The mortality returns speak for themselves.

"Lord Allenby's report—and his was a cavalry campaign—clearly points to the wonderful work of the R.A.V.C. It would do Lord Lascelles a deal of good if he would read it. The efficiency of the veterinary officers and their staffs, not only in regard to the care of horses and mules, but the wonderful way in which the camel corps was kept up to concert pitch, is undoubted. The mortalities in horses, mules and camels was the lowest of all the Allied and enemy armies.

"We know that 'better can be bettered,' but surely this applies to every walk of life, and there is no man more eager to become 'bettered' than the veterinary surgeon—the enthusiastic man I am more particularly alluding to—because he knows that if he fails to advance he becomes stale and 'grooved,' and is not in a position to compete with his opponent.

"Unlike the medical profession, our patients are valued at so much £ s.d., and consequently we do not get that glorious opportunity of research and experimentation. There is no sentiment, no blood tie between the owner and our patient, and that is where we are severely handicapped in our efforts to make continuous progress. But we are doing our best and we are alive to our shortcomings, which is something to be thankful for.

"It would be interesting to learn the data upon which his lordship bases his accusation against the College. Is it because of our antiquated (?) method of dealing with foot-and mouth disease? It is the best method under the circumstances, and the Parliamentary Commission on Foot-and-Mouth Disease (1922) will, I firmly believe, substantiate this procedure.

"Lord Lascelles has nearly touched the weak portion of the curriculum of the Royal C.V.S. We do want support; we get it in a small way from the agriculturists in general practice; but we require it before we qualify. The teaching schools require support from the Government. We get no grants, no research funds, and no help in any shape or form from the very people who stand to gain most from an efficient veterinary service. The funds come solely from the students, and Parliament sits and looks on with smug satisfaction. Compare this with Continental schools. Each one is backed up by its respective Government, and aided by grants, to advance the learning of its students.

"Let Lord Lascelles be our champion for more recognition than we have yet received, and he will have done a service to the public and the veterinary profession."

"UNIVERSITIES CODDLED, VETERINARY COLLEGES STARVED."

The *North British Agriculturist*, in an editorial article says:

"Viscount Lascelles touched upon a thorny question, when, in suggesting a wider development of scientific education as a preferable means of assisting agriculture, he entered a plea for extending the facilities for obtaining a veterinary degree. He would have the way opened up for University men obtaining such a degree without necessarily taking up the regular curriculum of the Veterinary Colleges. His theory, in short, is that there are better brains in the university than in the veterinary colleges. But, if he is correct in his estimate, let the better brains of the university, if so inclined that way, proceed to take the veterinary degree in the ordinary way. The veterinarian may be better equipped by a university training, but, as matters stand at present, the sphere of the university does not embrace a training in veterinary science; and there is no solid ground for supposing that a mixture of university and veterinary college would achieve better results than the existing specific veterinary training which leads to a veterinary degree. Hitherto, the veterinary colleges have been grossly neglected by the State. They have not had the support and encouragement which they deserve. While the universities have been coddled by the State almost beyond measure, the veterinary colleges have been allowed to struggle along as best they can, and yet they have succeeded in accomplishing brilliant work. With all due deference to the "old school," the veterinary officer of to-day is a more competent and accomplished member of the profession than it was possible for him to be before. His training is more comprehensive and complete. Viscount Lascelles charges the veterinary profession with mediævalism. One can see what his Lordship has at the back of his mind. It is that, in the case of the recent epidemic of foot-and-mouth disease, the veterinary fiat was to kill it out rather than attempt to cure it. It is not disputed that foot-and-mouth disease can be cured, but "the proof of the pudding is the eating of it," and by killing out the situation has been mastered. And it has been mastered at less cost to the nation than could have been possible by a peddling policy of treatment which, while not preventing the spread of the disease to the sheep stocks of the country, with probable ruinous results, would have indefinately prolonged the stoppage of live stock trading with foreign and colonial countries. Whatever criticism may be levelled against the actual administration of the Government policy in regard to foot-and-mouth disease, the policy itself was sound, and we fail to see how results would have been improved by any widening of the gate for the distribution of degrees in veterinary science."

Obituary.

It is with the deepest regret that we have to announce the death of Mr. S. W. GARNETT, of which notice has been received as we go to press—no details are yet to hand.

The Health of our Live Stock.

The prospect of changes in the law governing the importation of live stock as a result of the agitation over Canadian store cattle increases the importance and urgency of the problem of animal diseases. Having regard to the value of our herds and flocks and the losses that are endured from ailments of one class or another it is remarkable that so little attention has been given hitherto to research and experimentation concerning the scourges that afflict farm animals. We have been wont to write and talk volubly about visitations of foot-and-mouth disease and other infections brought to this country from abroad, and, no doubt, these outbreaks have been serious, alike in the harm they have caused here and indirectly to our valuable export trade in pedigree animals; but while vigilant and exacting over these diseases we have been comparatively indifferent regarding the less noticeable but far more destructive scourges of contagious abortion and tuberculosis in cattle, liver troubles in sheep, and corresponding ailments in pigs. The greater vexations and losses have been suffered in silence, and, in consequence, an impression has been created that foot-and-mouth disease and pleuro-pneumonia are all that matter, whereas as a matter of fact in an industrial sense the sum total of the mischief they inflict under present conditions is relatively unimportant.

It is necessary to emphasise this point now because of the dangerous position into which the country may drift in the matter of animal diseases if the true perspective were obscured. In the discussions on the Canadian cattle question references to disease have seldom extended beyond the better known scourges of pleuro-pneumonia and foot-and-mouth disease. In the popular conception these are all that count, and if Canada can satisfy us in regard to them all will be well. Farmers know, and the veterinary profession knows, that this is very far from being the case. There is just as great a danger of introducing tuberculosis from Canada, where the herds are admittedly addicted to the scourge, as there is of conveying the scourge from this country to the Dominion. The Canadians do not claim to have a satisfactory bill of health in regard to this and several other diseases; their own official reports would make any suggestion of comparative immunity untenable. Due importance, therefore, must be given to the risks that would be attendant upon the unrestricted introduction of cattle that may carry with them the germs of one or other of the supremely insidious diseases which, owing to their inconspicuous nature, have escaped the limelight throughout the discussions, but which, in fact, constitute a graver danger than the ills which, for the uses of argument the uninitiated have been schooled to refer to as the only menace to healthy stock.

The example of Canada is an excellent guide on this aspect of the case. The safeguarding restrictions which the Dominion imposes upon stock imported from this country refer only remotely to foot-and-mouth disease and such like scourges. When there is an outbreak of any of the scheduled diseases in Great Britain traffic in subject animals is suspended at once. The permanent conditions of quarantine are held to be wholly inadequate in cases of foot-and-mouth disease, and therefore, apply primarily to tuberculosis and other scourges that lie dormant for longer periods; in fact, the kind of infection that may not reveal itself, even to the expert veterinary eye, in less than several weeks, or respond quickly to the known tests for its detection and diagnosis. No exception can be, or is, taken to the care with which Canada seeks to prevent the introduction of animal scourges; on the contrary, her procedure is entirely exemplary. If we were to follow it, we should be paying her the compliment of imitation, and considering the pre-eminence of Great Britain in the breeding of live stock this is an honour she should not likely despise.

The suggestion of quarantine for imported cattle at British ports is rejected on the ground that it would be impracticable in the case of commercial animals. The cost involved, it is argued, would be out of proportion to the value of the cattle. That is probably correct, but what this country has to consider is the health of her priceless herds and flocks, and if there is to be laxity in regard to imported animals it would obviously be unfair to our farmers in the first place and imprudent in the broader national sense in the second, to impose more exacting restrictions upon home-bred stock than upon imported. In this connection it was revelant to emphasize, as some of the better-informed speakers did, the necessity for devoting greater attention to research and experimental work affecting animal diseases. Until more is known of the various ailments, and their prevention can be reasonably effective, it would go far to discount existing methods for raising the health standard of our herds and flocks, to throw open our ports without more than such casual inspections as are possible of cargoes of cattle drawn more or less promiscuously from many areas each several times the size of Great Britain. If it were proposed to restrict the freedom to bullocks or steers the risks would be appreciably limited, but equal permission for heifers and cows is demanded. It is in respect to these potential breeding stock that the need for the protection of the tuberculin test and quarantine is especially important, and to this on the grounds of consistency Canada should duly acquiesce.—*The Field.*

Tuberculosis Cutis.

Tuberculosis of the skin and subcutaneous tissue is apparently far more prevalent than is generally believed. A *post-mortem* record of 99 tuberculin reactors shows that 7 of these animals were affected with characteristic skin lesions of the disease. Another reacting cow evidenced no visible lesions *post-mortem*, but laboratory examination fully confirmed the presence of the disease in the visceral and subcutaneous lymphatics.

[A review of the lesions found in these 8 tuberculin reactors follows. We give the first two reports.—ED.].

Case No. 1.—Positive reaction to the subcutaneous tuberculin test March 11-12, 1918. Slaughtered March 14th, 1918. *Post-mortem notes*: Diagnosis, tuberculosis. Mesenteric glands, slightly caseous (wheat grain size lesion). Bronchial, post-pharyngeal and sublumbar glands hæmorrhagic. Subcutaneous lesion in region of left hind external coronet. Temperature just prior to slaughter, 101·7. Microscopic examination of the calcified nodules in the subcutaneous tissues showed the presence of acid-fast bacilli which have the true form and size of bovine

tubercle bacilli. Guinea-pig inoculations made to determine whether or not the microscopic findings were true tubercle bacilli or pseudo-tubercle bacilli showed that characteristic tuberculosis developed in the test animals inoculated with emulsions of the nodules. The two open skin lesions were located along the external and posterior border of the metatarsal region, near the hock joint. Several pea-size partially elevated cutaneous lesions of the nodular type extended into the subcutaneous tissues and covered an area about 2 by 3 inches in size. Some of these lesions were separate and distinct, while other lesions in the group were confluent. The affected skin was perceptibly thickened and entirely denuded of hair. An increased amount of fibrous tissue undergoing calcification surrounded the affected area. The caseous area was of very limited extent and presented a decidedly greyish-yellow cast.

Case No. 2.—Positive reaction to the subcutaneous tuberculin test March 13-14, 1918. Slaughtered March 15th, 1918. *Post-mortem notes*: Diagnosis, tuberculosis. Slight caseous lesions in cervical gland (one pea-size lesion). Bronchial and left prescapular glands hæmorrhagic. Skin and subcutaneous lesion in region of right metatarsus. Temperature just prior to slaughter, 101·6. Microscopic examination of the calcified nodules in the subcutaneous tissue showed the presence of acid-fast bacilli having the form and size of true tubercle bacilli. Guinea-pigs inoculated with the emulsions of the calcified nodules developed typical tuberculosis, which would seem to prove that the lesions found in the subcutaneous tissues were true growths of bovine tuberculosis. Several elevated pea-size lesions were located along the posterior and inferior border of the lower metatarsal region. The affected area was about 1½ by 2 inches in size. An increased amount of fibrous tissue was evident in and about the diseased area, which had the appearance of undergoing calcification. The affected area was denuded of hair. Incision through the diseased skin into the subcutaneous tissues revealed slight caseous deposits of a light yellow colour and of the size of millet seeds. No open or discharging lesions were evidenced.

Tuberculosis cutis in cattle, when due to the bovine tubercle bacillus, appears for the most part in the form of tuberculosis verrucosa. The skin lesions have a tendency to locate in distant parts where the circulation is sluggish or limited. Such places seem vulnerable for the development of the disease. The extremities are the most common site. The disease is not deep seated into the underlying tissues, but on the contrary, will for the most part be found superficially, or in close proximity to the skin. It seems most prevalent below the knee or hock, although some lesions may be found scattered over the body along the course of lymph glands.

The lesions of tuberculosis cutis are generally calcareous or caseo-calcareous, slightly hardened, tending to calcification, flattened, irregular in outline, small pea to walnut size, extending over a combined area seldom more than 1 by 3 inches in size. The disease is not diffuse or scattered, but is rather circumscribed. The lesions are sometimes hard or horny and may be crusted over. The irregular outline is somewhat rounded or oval-like. The lesions tend to be scant and may be overlooked unless careful search is made about the body, especially in the region of the extremities. A thickened skin caused by a hypertrophied fibrous development is frequently encountered, but not always present. The colour of the lesions appears to be greyish-yellow or light pale yellow. It is said that in lupus the tubercle bacilli are seen in extremely small numbers. Development is slow. The growth of lupus lesions is decidedly sluggish. A majority of the lesions are painless.

History of tuberculosis cutis is usually lacking, for this is practically a painless affection rarely accompanied by lameness or other serious manifestation of abnormality. An unhealed lesion may or may not be present. Ordinarily the skin presents no unhealed surface, especially if the disease has been present for any great length of time. Practitioners of human medicine state that lupus is more frequently seen among women patients. This is explained by citing the care that women exercise in maintaining a clean, unbroken, unmarred skin, which causes them to consult a physician as soon as skin lesions begin to develop. Men are not so inclined. The presence of lupus in cattle is found mostly in cows, for the reason that the tuberculin test is largely administered to cows, and greater care is exercised in locating lesions of known tuberculin reactors than is ordinarily given the regular run of slaughtered animals. It is not believed that sex affords any more specific influence in the development of tuberculosis cutis than is encountered in tuberculosis of the visceral organs or lymphatics.

The method of infection is extremely interesting. In a review of the history of the cases under observation it is noted that the animals for the most part were quartered in yards with other cattle affected with visceral lesions of the disease. Healthy cattle lying on the infected excreta from tuberculous cattle come in direct contact with the infection, and development of the disease at the point of inoculation may result, especially if any traumatic lesions caused by pricking, scratching or lacerating are present. Western cattle are not as a rule stabled to any great extent, but on the contrary are for the most part allowed to occupy a common feed yard with other livestock. The manure is removed from the feed yard at very uncertain intervals. This practice is conducive to the spread of lupus and may account for the increased percentage of tuberculous skin lesions found in Western cattle.

Differential diagnosis is not difficult. Epithelioma differs from tuberculosis cutis in that it is a benign affection having a pearly wart-like excrescence, rapid in development, is larger, rounded, roll-like, and has its origin in the epidermis or glands of the skin. Tuberculosis cutis of the tuberculosis verrucosa type is more frequently found either within the skin substance or in the underlying tissues. The lesions are irregular in outline and possess other characteristics peculiar to the disease.

Examination of cattle for tuberculous skin lesions could be made advantageously whenever tuberculosis is indicated or suspected as a result of the tuberculin test. If a careful palpation is made of the skin, especially in the region of the extremities, and any suspected thickness or other attending abnormalities noted, and form a part of a record to accompany the animal when submitted for slaughter, it would materially aid the *post-mortem* inspector in making his examination. In a like manner the *post-mortem* examination could be advantageously augmented by carefully palpating the skin of the extremities just prior to the time when the feet are removed, and, continuing this inspection after the feet are removed, a careful, patient, painstaking examination could be made to a good advantage of the outer and inner surfaces of the skin as well as the subcutaneous tissues surrounding the tendons, ligaments, bones, etc., in this region. The removal of the feet should be permitted only under the direct and immediate supervision of the attending veterinarian, for it is an easy matter for a small millet-seed to pea-size tuberculous lesion to be removed or destroyed during the rapid method of removing the hide so often practised in establishments having a large volume of slaughtering operations.—W. D. WRIGHT, *in the Journal Amer. Vet. Med. Assn.*

There is a prevalent idea that cattle necessarily endure considerable suffering on the voyage, and that a number of deaths almost always take place. If rough weather is experienced, the animals, as well as their attendants, suffer from sea-sickness and go off their food for a time, and there is a consequent loss of condition, which, if appreciable, may reduce the profits; but, under normal conditions, and with fair weather, the cattle get along very comfortably, and many shiploads cross the ocean without the loss of a single beast. —" W. H. B.," in *The Farmer and Stockbreeder.*

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

Tubing in Cattle Practice.

By J. CAMERON, M.R.C.V.S., Berwick-on-Tweed.

There is a subject on which, perhaps, I should have given my experience years ago. However, I think the present time may yet be opportune.

I went long since about eight miles to see a milk fever case, being told she was in a grass field, on her broad side and much swelled. I had my long piece of hose pipe tubing with me, which I put down into the rumen, and by which exit the gas was removed and the swelling quickly reduced. Of course the cow was quite comatose and could not swallow at all, therefore, I asked myself, why not give her medicines by the tubing? I did so, and ever since I have always, when going to a parturient apoplexy case, taken the wood gag and the tubing with me. In many cases, especially if they have not been long ill, and not on their broad side, then you may not have much gas in the rumen, but I always have some medicines which I wish to give them, and which, with rare exceptions, I have always given by the tubing with a funnel. I have always been convinced that the giving of these medicines in this manner was scientifically correct, and helped much to promote recovery and to shorten the convalescent stage. By using the tubing you never need to think about lung troubles, and with your medicines the breathing soon becomes quite natural, unless she has been spoiled before you arrived.

There is, however, another benefit which can sometimes be got by using the tubing, as proved by the two following cases. In these cases it was not secured by putting into the rumen, but by taking out.

A big, rising 3-year old Irish steer recently bought, early winter, required a good deal of attention and treatment and then began to improve slowly, therefore I left plenty of powders. As he was inclined to drink, advised giving plenty of thin gruels. After a few days, the owner told me, he was getting much swelled in the belly; I did not see why that should be but announced that I would call late that afternoon and see him again. A new urgent case prevented me seeing him until about 12.0 p.m. All were abed, but the steer was in a handy place so I soon saw him. He was still a mystery to me. The rumen was very full, but there was no very resonant drum sound. I immediately put the gag in his mouth and put down the tubing. Having to hold his head (nose) with one hand and push down the tubing with the other, the free end was down to the ground, and immediately after the tubing entered the rumen, the thin gruel came gushing out at the free end on the ground. This continued until at least a big stable pailful had run out, and then it stopped.

The horse water-trough was just outside the door, and I found a suitable cork in my pocket. I washed out the tube, filled it with water and corked one end and kept the other end well up, and then, getting a good hold of the steer's nose, I quickly put the open end down into the rumen and then took out the cork from other end. I was delighted to find the gruel issuing full flow as before and continued to remove about the same quantity. Then it stopped, and I again repeated the same process with the same satisfactory result. Before stopping, this time the outflow was not so liquid and the size of the abdomen was now much below normal, so I did not try any more. With continued careful attention the steer gradually got into ordinary satisfactory condition.

No. 2 was a good store stirk about 18 months old, spring time, part time on old pasture and part inside feed; abundant supply of A1 water. The owner was a very clever old farmer, and had done all he could think to reduce the much swelled state of the abdomen. The size was large, but, like No. 1, had not the tense drum-like vibrating sound. I could not satisfy myself in diagnosing the case.

I felt sure there was not much gas, but I at once put down the tubing and, as in the former case, the fluid in the rumen was at once in full flow. It, being mostly water, continued flowing without stoppage until the size of the abdomen was reduced to quite ordinary proportions.

The owner was very pleased, and admitted that he had never before seen anything so satisfactorily done. By isolation and restriction of fluids the stirk made an ordinary recovery.

This piece of tubing is also very useful in cattle practice in cases of choking with turnip or potato, etc., in locating the distance down the œsophagus where the obstruction is situated. It is much easier to use on the animal than are the ordinary probangs.

Significance of Impaction in "Grass Disease."

By M. G. ANDERSON, F.R.C.V.S., Coupar.

I enclose photo of a Clydesdale gelding, which is suffering from an attack of so-called grass disease. It is not to be expected that a photograph could show anything peculiarly distinctive of such a condition, though the most remarkable feature of the representation—the drawn up condition of the abdominal muscles—is a notable symptom in the less acute cases.

The subject is 6 years old and, before attack, had been in perfect condition. The photograph

was taken four weeks from the time of observable illness.

Stasis of the colon was not a feature of the attack, though colicky pains were amongst the first symptoms shown. This was in marked contrast to a case on the same farm, in which the horse had impaction of the colon, but gave no signs of abdominal pain till within twelve hours of death.

The presence or absence of this impaction seems to decide the course of the disease, but whether it is correct to refer to the two different forms as acute and sub-acute, or to regard them as two varieties, depending less on comparative severity of attack than on its different nature, it is not easy to decide.

Abstracts and Reviews.

The Topographical Anatomy of the Thorax and Abdomen of the Horse.

This book, which is one of the Edinburgh Veterinary Series, is a companion volume to *The Topographical Anatomy of the Limbs of the Horse* and possesses the outstanding characteristics of its predecessor, namely, clearness of expression, and conciseness together with a large number of unusually well executed illustrations. The author's hope that it may serve as a sufficiently full dissection-guide for students is certain of realisation. It is equally certain that it will prove of considerable value to practitioners.

There are 195 pages and 85 illustrations.

By O. CHARNOCK BRADLEY, M.D., D.Sc., M.R.C.V.S., Principal, Royal (Dick) Veterinary College, Edinburgh; Lecturer on Comparative Anatomy, University of Edinburgh. — W. GREEN & SON, LTD., Edinburgh, 21/- nett.

Bactericidal Power of Salts of Tellurium and Selenium.

The salts of tellurium and selenium have a bactericidal power, strong in the case of tellurium, weak in the case of selenium. The potassium compounds of both tellurium and selenium are more active than the corresponding sodium compounds, but the bactericidal action of the salts of tellurium and selenium changes also according to the germs used as test; thus they were found to be active on *Staphylococcus pyogenes aureus, B. cholerœ, B. coli communis, B. proteus vulgaris, B. pyocyaneus, B. typhosus, B. paratyphosus* A. and B., *B. dysenteriœ*; not active on the spores of *B. anthracis*.—A Cavazzuti (*Ann. d'ig.*, 1921, 31, 551, through *Med. Sci. Abs. and Rev.*, July, 1922, 315).

Toxic Action of Beech Kernels. Beech Kernels, and also the cake left after expression of the oil, have a toxic action on animals, and beech-kernel cake should not be fed to them. This toxicity is traced to water-soluble oxalates. The press-cake contains 0.51 per cent. calculated as crystallised oxalic acid. The toxicity can be removed by stirring the ground cake up with water and pouring off the acqueous liquid.—Sabalitschka (*Ber. d. d. Pharm. Ges.*, vol. 30, p. 259).

Standardisation of Digitalis Preparations. Seven tinctures and five infusions of B.P. strength have been tested. Four of the tinctures were found to be of satisfactory strength; three were notably weak. One or two tinctures produced few objective signs of digitalis action, while others had a sudden explosive-like toxic action. The infusions were not so satisfactory as the tinctures, only one preparation coming within the standard. The active principles tested, strophanthin and digitalin, were much below standard, and not found to be reliable.—D. S. Lewis and C. F. Moffatt (*Canad. Med. Assoc. Journ.*, Montreal, October, 1921, 11, No. 10, through *Journ. Amer. Med. Assoc.*, November 26, 1921, 1764).

National Horse Association of Great Britain.

A NEW ORGANISATION.

The joint committe appointed at the recent conference at Cambridge as representative of all the horse and pony breeding societies has selected the title of the National Horse Association of Great Britain as most suitable for defining their main object—the furtherance of the interests of the breeder and user of the horse and pony.

It has been agreed that the nucleus of the Association should be the horse and pony breeding societies, whose Councils will be asked to nominate delegates, based on a percentage basis of their membership, and upon which the annual subscription will also be based. These delegates will constitute the first Council of the Association, but power has been taken in framing the constitution to extend later the membership and representation on the Council to societies providing prizes for horses and ponies, and to federations of horse-owners and users.

It has been agreed that representations should at once be sent to the Minister of Agriculture urging him to oppose in every possible way the Exportation of Horses Bill recently introduced in the House of Lords, which has already passed its second reading.

Mr. A. B. Charlton has been appointed secretary (*pro tem*) to the Association.

A friend of mine, with interests in imported meat though not in Canadian cattle, is cynically frank about what he thinks is likely to happen when the embargo is taken off.

"The first time there is any foot-and-mouth disease in any part of the country," he says, "you will find Canadian cattle there. And whether they get there before the foot-and-mouth disease, or are brought there after it, you will find they will get the credit for it. After that there will be such an outcry for closing the ports again that the Government of that day will have to be very courageous to withstand it."—A writer in the *Star*.

Veterinary Matters at B. M. A. Meetings.

The recent meetings of the British Medical Association in Glssgow created a precedent in so far as members of the veterinary profession were invited for the first time to join in the deliberations.

In the section of pathology (human and comparative), presided over by Professor Robert Muir of Glasgow University, Wednesday forenoon, the 26th July, was devoted to a discussion on "The Origin of Cancer in Relation to Specific Forms of Irritation." There was abundant evidence that in the human family certain industrial forms of irritation are capable of producing cancer of the skin, and in the case of mice a similar condition can be experimentally produced by repeated applications of tar or similar irritants. Cancer is met with in all the domestic animals, and in the dog its incidence and situation most closely resembles that of man. In the cow cancer is found in later life, and may involve the abdominal organs in the stomach and intestines, but a remarkable fact as compared with the human is the rarity of cancerous growths in the mammary glands—they are practically unknown. How does this harmonise with the irritation theory? It must be admitted that if the irritation of lactation is a cause of cancer of the mammæ, then the cow should be more predisposed than the human subject—for is she not practically a milking machine? and, furthermore, the udder of the cow is constantly exposed to injury from being trampled on in the byre, or being torn on wire fences, or gored by the horns of her companions, apart altogether from the liability of this organ to develop garget.

On Thursday, 27th July, the forenoon was similarly devoted to a discussion on "Animal and Vegetable Pathology in Relation to Human Disease." A wide field was covered, and many diseases common to man and the lower animals were under review. Tuberculosis, anthrax, glanders, rabies, foot-and-mouth disease, mange, ringworm and parasitic diseases were dealt with. It was generally acceded that the existing legislation relating to the control and eradication of tuberculosis in cattle was far from adequate, and that steps should be taken to re-establish the Cattle Tuberculosis Order which was making headway in 1914, but which has been suspended since the outbreak of war. It is estimated that no less than 85 per cent. of the cases of tuberculosis of the glands of the neck occuring in children are of bovine origin, and that over 10,000 children die annually from drinking tuberculosis milk, and that we have fully a million tuberculosis cattle in Great Britain.

Sir William Macewen, the President of the British Medical Association, was present during the proceedings and related some personal experiences of the transmission of tuberculosis from cattle to man. He felt strongly that drastic steps were necessary to stamp out this disease, which was a serious menace to the health of the community at large. He extended a cordial welcome to the members of the veterinary profession, and was convinced that the study of comparative pathology was most essential to the further prosecution of research in many complex problems of disease. The professionals were one and their object identical, there was no line of demarcation in the great fight against disease. With cordial relationship and co-operation between the two branches of medicine, he confidently anticipated great advances in the future.

Representatives of the veterinary profession included Professor Hobday and Dr. James, M'I. M'Call, London; Dr Bradley and Professor Gofton, Edinburgh; Professor Gaiger and Professor J. R. M'Call, Glasgow; Mr. Scott, Bridgwater, and others *The Scottish Farmer*.

Losses due to Suspected Anthrax.

The question of the losses sustained by farmers in connection with unconfirmed cases of suspected anthrax was recently made the subject of a letter by the Forfarshire local authority to the Ministry.

At a meeting of the authority in Forfar, a reply from the Ministry was read by the clerk stating that the Ministry could not concur with the authority's view that the diagnosis arrived at by a local veterinary surgeon might be accepted whether it was negative or positive. It was also advised in the letter that farmers should, in order to cover their losses in such cases, insure with the Insurance Companies for "all loss" instead of "loss by anthrax" only.

Mr. W. Smith, Balzeordie, said the fact remained that it was on the report of the local V.S. that they acted. They interfered with farmers' business, and after doing so the farmers got no compensation. Mr. Smith thought this was placing that body in a false position.

They had a perfect right to take proceedings, but if the result of these proceedings was not to be carried out on the verdict of the local Inspector, it simply put them in the position of petty tyrants interfering with other people's business. Farmers were very badly used. It was all very well to say that they could make a bargain with the Insurance Companies, but they knew perfectly well that these Companies would make no compensation unless the Government Inspector confirmed the disease.

"An exhaustive series of experiments by Dr. Dembo into the exact time when *rigor mortis* sets in in the case of animals slaughtered by direct bleeding (the Jewish method) and the various other methods of killing, showed that in the former one hour and ten minutes elapsed between killing and onset of *rigor*, and in the stunning method two hours and thirty-five minutes. Hence the progress of putrefaction is much less rapid in Jewish meat than in meat slaughtered by the stunning method. *Shechita* is more humanitarian and more hygienic than other systems of killing."—*Jewish World*.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents.

National Association of Veterinary Inspectors.

SIR,

In reply to the letters of Mr. Hogben and Mr. Stevens, I claim that the National Association of Veterinary Inspectors has not been unsuccessful in helping to obtain, for its members, in many counties, a higher and more uniform rate of remuneration.

If the efforts of the Association have failed, in the counties in which your correspondents reside, this is due to the unfortunate fact that the Authorities, in these and some other counties, have decided that the fees and allowances at present paid are as liberal as they can afford to make them.

Anyone who understands the responsibilities which veterinary inspectors are called upon to undertake, must sympathise with those who are still disgracefully underpaid, but, in seeking a remedy, your correspondents must not conclude that they are the only live people in the picture.

The pages of more than one number of "*The Record*" could be filled with the discussions which this subject has received at the hands of the N.A.V.I. The matter has been thrashed out again and again, until finally a scale of suggested fees was adopted, published in the professional journals, and circulated to every member of the Association.

At the same time members were advised to call together their colleagues, in the different counties, and adopt the scale for presentation to the County Authority, with an intimation as to its origin, and calling attention to the fact that the fees therein set out had already been sanctioned by a number of County Councils.

The Ministry of Agriculture and Fisheries were also approached with a request that the possibility of raising the fees payable to Local Veterinary Inspectors might receive favourable consideration. The reply of the Ministry was favourable and, within a few weeks, an increase of 20% was authorised.

In July 1919, you were good enough to publish a letter from me which I should be glad if you would allow me to reproduce, as follows: —

"On May 31st, (1919) you were good enough to publish a report of a meeting of the Council of this Association in which was set out the scale of fees now paid to veterinary inspectors in the West Riding of Yorkshire.

For the benefit of those who may not have seen this report, I should be glad if you would allow me to repeat the items which have been adopted by the Council of the N.A.V.I., as fair and reasonable remuneration for the responsible duties involved.

For each visit and inspection, 21/-. For the second and every other visit on any other day, if on the same round as the first, 10/6. If not on the same round, 21/- Re-inspections (including parasitic mange), 10/6. For *post-mortem* examination or microscopical examination of blood, 21/-. Mileage in all cases 7½d. per mile each way (or 1/3 per mile the double journey from Inspector's residence). The Council expressed a decided opinion that strenuous efforts should be made to secure adoption of this minimum scale by every County Authority in the Kingdom.

The machinery by which this much needed reform can best be obtained is not easy to set in motion. Obviously, I, as Secretary of the Association, cannot approach each and every County Council in the Kingdom, if only for the reason that I do not know who or where they are. There is another and better method however, which is, that in *each County*, one or more veterinary inspectors should call together the whole of the inspectors in that County, adopt this scale of fees which has the official sanction of the N.A.V.I., and forward the same to their respective County Authorities for the latter's kind attention. *A report as to acceptance, alteration, or refusal by the Authorities concerned should then be sent to me* as early as possible for consideration by the Council of the N.A.V.I. Possibly the first steps could best be taken through the kind co-operation of the various veterinary medical associations as is being done by the South Eastern Association, the Hon. Secretary of which, Mr. H. P. Hogben, writes me to say that they are already moving in the matter, and asking me to give him the official programme of the N.A.V.I., with regard to the ways and means of gaining a more equitable scale of fees than those at present paid throughout the Country generally."

My request to be furnished with information as to what progress was being made was responded to by only 12 counties. Of these, six had succeeded in obtaining our official scale (one or two had exceeded it) and six were still below the minimum, to a greater or smaller extent, although one had gained a 25% and another a 50% bonus on pre-war rates.

We were now up against the trouble that only 12 counties had condescended to tell us whether they were thriving or starving, with the additional difficulty of deciding on practicable means by which the low fees could be levelled up.

It was finally decided to approach the Association of County Councils direct, with a view to their taking the matter up, and authorising a uniform scale payable by every County Authority in the Kingdom.

This was done, and the official scale as suggested by the N.A.V.I., sent as a model below which they were asked to fix no fees without first receiving a deputation of the N.A.V.I., to discuss the matter with them.

A special Committee of the County Councils Association was appointed and sat at intervals over a period of several months. Nothing having been heard of the work if this committee, at the end of this time, I again wrote to the Secretary, and was informed that "in view of the complexity of the matters involved, the Committee had not yet reached a decision."

A few more months elapsed and they were again asked as to any decision which might have been reached.

The answer I received had such an effect that I have never trusted myself to reply to it. It was that, "in view of the complexity of the matters involved, the Committee could make no recommendation"!

I gave this correspondence to the Editor of one of the Veterinary Journals, but, as I have never seen it published, I conclude the Editor, like myself, dare not trust himself to express his views upon it.

Now, may I ask Mr. Hogben and Mr. Stevens, what course they would recommend under the circumstances detailed above?

Mr. Stevens suggests a militant attitude "rather than drive five miles for 2/-." I quite agree that *any* attitude is preferable to the journey at the price, but there are other important points to be considered. The first is that in veterinary warfare, as in most other kinds of fighting, no sooner is one combatant struck down than another takes his place, together with, not only the two shillings, but any other emoluments which presumably are super-added to the mileage allowance. Another point worthy of consideration by those in favour of "a militant attitude" received notice in a leading article in "*The Veterinary Record*" of December 13th, 1919. Personally, I do not wholly, or even substantially, agree with the views therein expressed, but a few quotations from the article may provide the militants with food for thought.

"Some still object to the idea of whole-time veterinary inspection throughout the country, but it can hardly be doubted that the change is coming . . . . . Sooner or later it seems inevitable, and it may well come in the near future. Well organised, it should meet the national needs better than the present methods, and this the profession ought to recognise . . . . . A system of whole-time veterinary inspection, adequately

manned and well organised, would be immeasureably superior to any part-time one, and that consideration ought to over-ride all others."

In conclusion, may I point out that the *primary* reason for the formation of the N.A.V.I., was the necessity of organising the resources of the veterinary profession in consequence of the important demands which were to be made upon it under the provisions of the Tuberculosis Order (1913).

Since the *first* reason for its existence has been shelved, the vitality of the Association has suffered, but, the only "artificial respiration or strong stimulants" needed for its resurrection, are those which will be automatically provided, if and when, the Order which brought it into existence is resuscitated.

Your obedient servant,
TREVOR F. SPENCER,
Hon Sec. (pro tem.), N.A.V.I.

London Road, Kettering.
August 16th, 1922.

Testing for Contagious Abortion.

SIR.

In the *Veterinary Record*, for December 24th, 1921, there appeared an article on Infectious Abortion by Mr. L. E. W. Bevan, Rhodesia, in which reference is made to "a more simple method (than agglutination test) that has been devised by which the veterinary officer, or, indeed, the *farmer himself*, will be able to test suspected animals, without sending the material to the laboratory."

As one interested in Abortion, I have awaited the details of this "simple method." I should be very glad to hear from someone who is conversant with it. Possibly, if the writer of the paper sees this request, he may be able to furnish to your paper an article of great use to almost every Country practitioner.

Yours faithfully,
W. F. ASHTON.

Royal (Dick) Veterinary College, Edinburgh.

SHORT COURSES FOR PRACTITIONERS.

PROVISIONAL PROGRAMME.

Abdominal Conditions in Small Animals.
PROFESSOR W. M. MITCHELL, M.C., B.Sc., M.R.C.V.S.

Clean Milk : Production.
PROFESSOR R.G. LINTON, M.R.C.V.S.

Clean Milk : Bacteriology.
PROFESSOR D. C. MATHESON, F.R.V.C.S., D.V.S.M.

Veterinary Jurisprudence : Warranty and Evidence.
MR. J. R. GIBB, ADVOCATE.

Recent Advances in our Knowledge of Sex-Determination.
DR. F. A. E. CREW, M.B., D.Sc.

A General Discussion of the Parasitic Worms.
PROFESSOR J. RUSSELL GREIG, M.R.C.V.S.

Demonstrations of Parasites.
PROFESSOR R. STEWART MACDOUGALL, M.A., D.Sc.

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

President : BRENNAN DE VINE, ESQ., F.R.C.V.S.

CAMDEN HOUSE.
WEST BROMWICH,
August 17*th*, 1922.

SIR,

At the last meeting of this Association, it was unanimously resolved that the Summer meeting should take the form of a Picnic, and a small Committee was appointed to carry out the necessary arrangements.

The Committee have arranged a picnic to Tewkesbury, on Thursday, 31st inst., as under :

The Party will meet at Worcester Bridge Wharf, Worcester, at 11. A special boat will leave Worcester Bridge wharf at 11.15 a.m. to carry the party down to the River at Tewkesbury. Lunch at the Lower Lode Hotel, Tewkesbury on the arrival of the boat. Tea will be provided on the boat on the return journey, and the boat will leave Tewkesbury at a time to suit the convenience of the party.

Ladies and Members' friends are especially invited, and the President hopes that every member will do his best to attend in order to make the picnic a success.

Full particulars and tickets from the Hon. Sec.

Yours faithfully,
H. J. DAWES.
Hon. Sec.

Notes and News.

The Editor will be glad to receive items of professional interest for these columns.

Ancient Tombs of Horses,

Relics have been unearthed at El-Kur'uw, on the Upper Nile, which shed new light on the early history of Ethiopia, the tombs of all the kings from 750 B.C. to 250 B.C., having been recovered.

It is known that King Piankhy was a great connoisseur of horses. In his account of his besieging the Egyptian city of Eshmun he tells of his anger at finding the horses of King Namlat starved thin as a result of the siege. Hence it is reasonably conjectured that Piankhy started a cemetery of horse graves which has been found at El-Kur'uw—the only burying ground of its kind that has been discovered in the Nile valley. Here, in four rows, are the graves of the steeds of several monarchs. They have been plundered, but not so thoroughly as to prevent finding some of the trappings ; a plume carrier, a silver head-band, four strings of very large bronze balls, beads, amulets and other objects.

When it was mentioned at Stratford on July 17th that a veterinary surgeon's fee for attending the horse at the police station was 15s., and also 15s. for attending court to give evidence, Mr. J. Trumble (one of the Justices) said : "I protest against those charges. A veterinary to get 15s. and a fully qualified medical man only gets 10s. 6d." He was told that it was the scale of fees laid down.

The production of wheat in Canada is estimated to be 40,200,000 quarters, and in the United States 100,700,000 quarters, representing increases over 1921 of 7 per cent., and rather over 1 per cent. respectively. The oat crops in these two countries are calculated at 55,600,000 quarters and 128,500,000 quarters, the increase over last year's harvests being in both cases approximately 19 per cent.

An American member of the Society for the Prevention of Cruelty to Animals was touring Spain. She met a Spanish nobleman. "Do subscribe to my Society," she said. Finding her attractive, he made no enquiries. "I'll do more than that, dear lady," said he. "I'll get up a bull fight for your society's benefit."